



THE MUSIC SUPPLEMENT

THE COMPLETE KEYBOARDIST

The TGM Music Supplement



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The Compleat Keyboardist



Welcome to the unique TGM music supplement. The idea was developed from the letters that have come into the office; so many people request advice, wanting to know the best way and the best products to add to their computer. Or maybe you haven't got a computer yet and are wondering about the music capabilities.

I will try to advise and guide; with Christmas coming up it would be a good idea to spend your shekels wisely. This guide is based on my personal experience, gained in quite a few years of working with and reviewing the equipment.

Apart from the micros themselves I shall be taking a long look at the add-ons for the computers. This will mainly concern MIDI products, but there'll be a quick look at what you could do if you haven't quite got the dosh to enter the market yet.

Although some of the equipment is pricy, I will be recommending the best second-hand bargains for a cost-effective shopping spree. In some cases the choice was quite hard, and the deciding factor was often the availability of programming software.

There are also helpful hints and tips, and a basic guide to what does what. The area of music and technology is expanding rapidly, and as it grows larger so the jargon slang develops. Acronyms and slang, plus the usual technospeak associated with any computing field, form a new language.

Lastly, a quick plug for the TGM cassette, which uses pretty well all the equipment in this supplement. At about 60 minutes worth of music, it contains a variety of styles and sounds that should give you a few ideas as well as a pretty good listen. It only costs £2.99 and is available at the moment only to TGM readers. The rest of the rabble will have to wait. And now, play on.

Jon Bates

What computer?

Not another *What?* magazine, but a comparison of how the different micros shape up and flex their musical muscles. This may show you what upgrade to get – or how good your micro already is for music.

Once upon a time, as far as the home micro was concerned, the musical sphere consisted of beeps and blips. The very basic micros just had a beeper chip (like the good old 48K Speccy). Slightly more adventurous manufacturers had bought the arcade-game standard chip, the AY4891 from Texas Instruments, which has induced more migraines in games arcades than any other chip known to man.

The list of micros that used and still use this chip rolls on: BBC, Spectrum 128K, Atari ST (rumour is rife that the internal chip on the ST is Yamaha, but it still is billed as an AY), obsolete models like the Dragon, TRS80, and most of the PC-compatibles with their simple bleeps.

The first step forward on the internal chippiness was the SID from Commodore. Hailed as a great music chip, it did have improved filtering and sound and noise modification – but the basic sound was not that much better. It is only with the Commodore Amiga and the Acorn Archimedes that we get internal chips with vastly improved sound capabilities.

These custom-designed chips are capable of all sorts of sophisticated sound manipulating and synthesis. The software is still in the embryonic stage, but they could prove to be very powerful from the specifications and initial dabbings.

Going digital

All that chip business concerns the *internal* capabilities of the micro, using its sound chip as a tone-generator. Another sound solution is to sample a sound digitally, code and load it into the micro, and then trick the sound chip – in order to decode it back into a sound.

Rob Hubbard achieved this on the Commodore 64, and the Amiga and Archimedes lend themselves very well to this task. Yet though this may have sonic advantages, it's very greedy on the memory.

ST software has used sampling too, but there the samples are converted to sound via the AY chip and the results are not really up to par.

The Amiga programs I have seen seem to run a suite of programs that can pull in modules as required. There's not a lot of Archimedes music software yet, and the stuff reviewed only uses samples which you can manipulate. Neither of these two micros has the possibility to actually create your own samples without a bolt-on device.

And, to be honest, if you have to buy a bolt-on piece of hardware that will just sample and not play back, you may as well buy a separate sampler that can be controlled from the micro. The sampling hardware for the ST and the Amiga is only just around the corner, though.

Why the ST rules

Control, that's really the name of the game. The micro comes into its own when acting as a controller of musical tools and instruments, rather than a stand-alone creator of sound as such. The language and protocol used for letting instruments talk to themselves, to micros and vice versa is MIDI – about which you can read to your heart's content in the next section.

In the UK there are now very few producers of MIDI software. Perhaps it's to do with the mercurial shifts in the market, and the fact that decent software takes a long time to write and correct and is relatively expensive.

But the prime reason is that the big music machines worldwide are American, and therefore the American software houses have kept well ahead. (They're closely followed by West Germany.) In the States, IBM PC-compatibles have the edge on the music market, closely followed by the Apple Macintosh range and the ST. In the UK it is a slightly different story.

The MIDI market leader here was the Commodore 64, which again ran on many imported programs. However, there's quite a big market for the Spectrum too, perhaps because so many machines have been sold. Readers who have followed the tales from the 'Bates Motel' in CRASH will have no doubt noticed that there is no shortage of MIDI software for the two or three interfaces that run on the Spectrum.

The BBC Micro did not prove such an interesting market – surprisingly enough, since it's been a common choice for school computing. On the other hand, that could be the very reason that BBC MIDI software sold like meat to vegetarians. Many music departments are frightened to death by any suggestion of new technology within their cloistered confines.

The market leader is undoubtedly the ST, with pretty well most types of MIDI software. It has built-in MIDI ports, and therefore the owner does not have to spend £100 or more on an interface. It also means that MIDI software for the ST is genuinely interchangeable.

One flaw in the compatibility of MIDI is that although the instruments and language are very talkative, the link between a program and an interface may not be. Software houses have tended to develop their own interfaces that refuse to run any other make of software. But it's pretty short-sighted, this, as the concept of MIDI was to avoid incompatibility and its subsequent financial self-strangulation.

Interfacing facts

All other micros will need an interface. The PC interface comes from Roland and costs a mere arm, leg and neck as it weighs in at about £185. The Amiga interface for the UK comes from Datel, and though reports so far indicate universal compatibility, it's due for rigorous testing in a future issue of TGM.

Commodore 64 interfaces are not so common – like BBC interfaces – but Spectrum interfaces are quite thick on the ground. Interfaces for all three machines can be picked up second-hand, usually with software. And Spectrum interfaces can still be bought new from XRI, Ram Electronics and Cheetah.

A final word: it is of course the software that makes the whole setup run. If you are heavily into video and film work, the best micro is either a Mac or a PC. There's American software specially geared up for this line of business, as well as an abundance of other MIDI goodies.

And if you are starting MIDI from scratch, it's really the software that you should consider – as well as the all-important budget, which I'm sure will loom large on most purchasing horizons.

But if you have a none-too-common synth and want voicing software, then check out the software *before* you buy a budget micro. It may have very little that's any use.

SAMPLER

This translates electrical impulses – from, say, a microphone – into digital coding. The digital code is then ready for manipulation – by repeating and looping sections of the sound, or by distorting its shape or tone. In some cases, new sounds can be created by mixing the sampled sound with a digital waveform.

The note or sound can be played back at any pitch or pitches played or sent into the sampler unit. The resulting digital sounds are then decoded.

Therefore, the sound chain is: analogue to digital, sound manipulation, and then digital to analogue. Nowadays sampling is overused to death (*n-n-n-nineteen*), but believe it or not when it was first shown in 1979 as a feature of the first Fairlight (very expensive synth system) no-one could see any use for it. Perhaps the best uses of the sampler are those where it is not obvious.

SEQUENCER

A software program that records and plays back MIDI data. Depending on the sophistication of the program, it allows you to mix, cut and paste, repeat and generally edit the notes as you wish. The really up-market jobs can round up your mistakes in many different ways, alter the individual MIDI commands, and store parts or all of your songs to disk.

The sequencer is a musical equivalent of the word processor – and growing up the same way.

DRUM MACHINE

The descendant of the rinky-dink awful rhythm boxes found on cranky old organs of the Sooty variety. Nowadays a drum machine can cost as much as a synth itself. There are several ways of generating the tones: analogue chips (much favoured for house music), digital reproduction, or actual sampled drums.

Usually even the most basic will have some sort of touch-sensitivity or accent feature. Used in isolation, they have their own sequencing devices and will let you code up the patterns for whole songs (though that's not my personal way of working).

The sounds often have built-in effects such as gated reverb (for Phil Collins emulators everywhere), and if you pay enough money you can usually get into tuning the drums and doing all sorts of tricks – sometimes loading up new sounds from a cartridge or by adding a sound chip.

CONTROL/MOTHER KEYBOARD

A mute keyboard that looks like a synth, except that it has no sounds on it whatsoever. Its function is to control all the other synths that it is MIDI-connected to, and therefore it has a wealth of MIDI control buttons and sometimes complete setup memories for those slick changes in the middle of your live solo.

VOICING PROGRAM

A wonderful device. Digital synthesizers are at best a rectal discomfort if you try to program from their front panels. There you have a 17-character LCD which may or may not be backlit. From this you are expected to be able to grope your way through the hundred or so peripherals that go to make up the sound. Working in numbers is okay if you have a memory like a telephone redial facility, but for lame brains like me it has to be in lovely graphic form. And that's where the voicing program comes in.

What the program can do graphically will depend on how much you pay. At their most basic, voicing programs will just display all the numbers that make a sound, and as you hit them with the cursor they exchange them up or down. At its sophisticated best, the voicing program will have graphs that you can change at the stroke of a mouse – and then you can overlay all the patterns to get a three-dimensional picture of the sound.

Coupled with an extensive library facility that is almost like a database, plus devices to set up basic sounds to meddle with, I find these the most useful tools to have. Many of the superior sequencing programs will take the data for a sound and at the chosen moment squirt it into the synth, so you don't have to set up the voice banks to correspond with the numbers that you used when you set the song up in the first place. (That's always a pain when you return to something you were working on months previously!)

SINGLE KEYBOARD

Always a tricky one to define. Strictly speaking, a single keyboard is a self-contained musical instrument that has drums, autobass, and autochord/arpeggio/accompaniment features. You play a note or chord with your left hand and the tune with your right hand. The drum pattern fires up the auto accompaniment and away you go.

Again, the digital wizardry you get is generally relative to the price. What I have described above is the most basic of all; it will also have a few preset rhythms, minikkeys, single-finger chord only, a speaker the size of a corn plaster and no MIDI. It will come complete with an aggravating demonstration tune that doubles as a soundtrack to your nightmares.

Going to the other extreme, the upmarket instrument will have programmable drum patterns, programmable bass and chord/arpeggio patterns, full-size keys, stereo speakers, and the ability to store and download voices, tunes and patterns.

The MIDI spec may well allow you to access each section separately, thus making this piece of hardware a damn useful expander.

On the other hand, if you want to use this instrument as a master keyboard, the MIDI specs will allow it to transmit each section on a separate channel. Just add a tone expander and you will boost sounds and store them, either individually or as a group for a particular song. It could be touch-sensitive; it will almost certainly be well up toward the £1,000 mark.

MULTIKEYBOARDS

The newer technophrase coined mainly by Yamaha to describe the modern version of what looks like an electronic organ. Multikeyboards consist of two rows of keys (manuals) and a set of pedals plus a foot volume (expression) control.

To some extent they are hampered by the Seventies image of rotten tunes pumped out in a greasy 'fun pub' on the beach at one of our rain-sodden resorts. And though many of them are aimed at the market that just loves to hear the sound of Blackpool Tower Ballroom recreated in the living room, some have an enormous potential.

The best have tons of preset voices, the ability to set up your own voices, sampled drums, and a very comprehensive MIDI spec – and they are very compact. Plus you can actually play them as a self-contained unit in real time. (Gosh! You mean you can actually play it without any extra add-ons? This could mean some talent is required!)

Okay, so far you're mystified. None of the terms make any sense and your passing interest in this supplement and its subject has sunk lower than a snake's backside. Here's a brief introduction and definition of micro music equipment.

SYNTHESIZER

A device for creating sound, usually by digital methods though originally by analogue techniques. A synthesizer is *not* a complete instrument. Though it may well have hundreds of sounds underneath the anonymous fascia panel, it is not a stand-alone instrument – that is, unless you are going to pay a fair amount of money so that you can generate and play back several sounds at the same time.

Sometimes there is a crossover between the synthesizer and the single keyboard, which makes defining the instrument rather difficult. But all synths have MIDI ports which will enable many wonderful things to happen – provided you have something else to interface it to.

MIDI

Although this topic has been written about by virtually everybody and his dog and now supports a considerable literary industry, I figured that there could be a few of you who could appreciate yet another scan through the facts and attributes of the interface language.

Besides which, no self-respecting music supplement is complete without its MIDI page, is it? If you figure you're clued up sufficiently on this area then select another page *now*.

MIDI (Music Instrument Digital Interface) was developed because the world's major electronic-instrument manufacturers were killing each other, and their own sales, by marketing their own individual synthesizer systems. If you wanted to expand your system from company XYZ you had to buy an XYZ tone expander. No other one would do, as the interface port and communication standard used were peculiar to that manufacturer.

So if you wanted an XYZ synthesizer you had to have an XYZ system as well. Just to cap the whole thing off, when you had finally paid the last instalment on your treasured setup, lo and behold the swines brought out a new one which was totally incompatible.

This rendered yours obsolete, as it was incompatible, and also gave it the second-hand value of a 15-year-old Skoda.

But as synths and similar instruments were moving towards the digital, a universal communicating language seemed obvious. Hence MIDI emerged from several meetings between manufacturers in about 1983.

Easy as ABC

The overall concept is pretty easy. The features that are common to all synthesizers – notes, pitch-bends, footswitches, voice-change buttons and volume – are all given universal numbers.

If a synth has touch-sensitivity, information on touch can also be communicated to other MIDI equipment – but only if the receiving instrument is itself touch sensitive. In fact, if an instrument does not have a particular feature it will not respond to that piece of data.

Drum machines get a look in as a common timing pulse was incorporated into the protocol. There's no more fiddling around for converter boxes to change one clock pulse to another – just lock one machine up to another and away you go. And they'll usually do other things, like locate a specific bar within a song so all the drum machines in use can start off from the same point.

MIDI information is transmitted between instruments on 16 channels. Each instrument can choose to send or receive on any of the channels, either individually or on all of them at once – this is called **omni mode**.

Data is sent in digital code, so this is an ideal opportunity for the micro to step into the chain. It can sort out and store all the data, and of course change it about as the user wishes.

An active pulse is usually sent every 300 milliseconds. If an instrument fails to receive this it becomes dormant, thus avoiding the dreaded 'note drone' – a note that has become stuck because the instruction to turn it off has been mislaid.

Obviously there are limitations to MIDI. A log-jam effect can occur if there are many instruments in the chain sending lots of data, and cables have to be restricted so that the longest run is 50 feet from start to finish. Otherwise the resistance of the wire in the leads will soak up some of the data, and lead to scrambled performance.

The other part of the MIDI system is the **Systems Exclusive** part. This is the area of the language reserved for each manufacturer to define for their own particular machines. After receiving the appropriate data flag, the instrument will await specific instructions from its maker – so to speak.

Usually this data will program the actual sounds of the synthesizer. And with the Systems Exclusive, voice data can be sent, either as part of a song or from a voicing program. You can, of course, transfer Systems Exclusive data between identical synthesizers.

So far I've only scratched the surface of the workings and ways of MIDI. Not that you need to know exactly how it is coded – just the right way to go about using it. Probably more than 90% of MIDI-related problems come from the user.

So you don't need to know much about code. But you could, if you wished, actually write your own MIDI program to talk to you instruments in no uncertain terms. Indeed, it's virtually impossible to avoid nowadays if you are working seriously with synths.

If, like many home users, you are desperate to record your efforts onto tape, use a sequencing program. This enables you to build up tracks without losing quality, unlike conventional tape-recording methods. TGM will publish occasional guides to home recording, as it goes very much hand in hand with the MIDI home studio.



Single keyboards

I have picked what seems to be the best value around at the moment, in no particular order. Obviously the first thing you need to look for is the MIDI port.

Casio and Yamaha are vying for the 'cheapest MIDI keyboard' award. The Yamaha PSS480, though a trifle more expensive than the Casio MT240, does have the advantage of being able to create voices and store them. However, the Casio has a slightly easier MIDI spec to understand.

Yer pays yer money and yer gets yer choice – as with so many other things in life.

New

YAMAHA PSS480

Recommended retail price: £179.99

Voices: 100 preset onboard, option to program your own

MIDI specs: Very comprehensive, with all channels assignable and the auto functions sent. Will also receive and dump both voice and sequencer data.

No of keys/notes: 49 minikeys, but will respond to seven octaves via MIDI.

Comments: Although it is only a two-operator voice system, the waveforms are variable and this gives you a wide tonal range. The MIDI specs are very comprehensive indeed, and as a master keyboard and tone module it is very good value for money indeed. It has a larger relation, the PSS680, which will set you back £249.99. Quite stunning.

CASIO MT240

Recommended retail price: £149

Voices: 20 preset sounds, plus 210 mixes of these sounds.

MIDI specs: Will function on four channels simultaneously, to give six-note polyphony, plus the drums.

Keys/notes: 49 minikeys.

Comments: The cheapest MIDI keyboard. Although limited by the voices, it is quite an adaptable tool and certainly superb value for money both as an expander and as an instrument.

Second-hand

CASIO CZ230S

Rough price: £100-150

Voices: 100, with four that are programmable.

MIDI specs: Four channels including drums. The real bonus is that you can use CZ voicing programs to set up the voices.

Keys/notes: 49 minikeys.

Comments: When sequenced tracks were played, I was convinced I was hearing a much more expensive piece of equipment. The PCM drums sound good with reverb. No velocity sensing. Bonus is that the drums are out via a separate audio socket.

YAMAHA PSR70

Rough price: £300-450

Voices: 64 sounds preset to various channels.

MIDI specs: Channels preset but fairly comprehensive. Best if you have a MIDI guide for this instrument. It will dump sequencer data, and transmits and receives quite a lot of data, but not velocity.

Keys/notes: 61 full-size keys.

Comments: The sounds are very good, and though they are preset it makes for a useful master keyboard and expander all in one. Sadly the auto patterns are not transmitted – but if there's one about, grab it.

Tone modules

Again, I'm aiming at a low budget as this is the prime target for micro musos. All these – apart from the Cheetah – have oodles of programming software available for most micros. But oddly, there aren't many tone modules under the £500 mark.

New

ROLAND MT32

Recommended retail price: £450

Voices: 128, plus 64 user-programmable.

MIDI specs: Very comprehensive, multitimbral on up to eight selectable channels, with full voicing facilities via the Systems Exclusive mode.

Comments: Stunning sounds from such a tiny box that uses the same principle as the D 50 synth. As it has a big and effective percussion section (similar sounds to the TR626), you could dispense with a separate drum machine; being multitimbral it gives you many sequencing combinations.

However, you'll need voicing software to get the best out of it. Any voices you create will disappear when the power is switched off, so dump them into a library beforehand. Has built-in four-stage reverb.

KAWAI K1M

Recommended retail price: £395

The specs for this are identical to the K1 synthesizer's.

YAMAHA TX81Z

Recommended retail price: \$449

Voices: Many combinations of four banks of 32 voices each, plus 32 user-programmable voices and 24 'performance memories'.

MIDI specs: Full specs with nothing left out; voice dumps and programming well covered.

Comments: Very popular tone expander using enhanced four-operator principle. Sounds can also be dumped onto cassette, and it will load up voices from DX100-type synths as well. Programming software easy to come by. Eight-note multitimbral with microtuning facilities.

CHEETAH MS6

Recommended retail price: £249.95

Voices: 320, plus 96 user-programmable, 64 performance memories.

MIDI specs: Very good, as far as I can tell.

Comments: It certainly sounds well, but I have yet to get my hands on one. The manual does not have a MIDI implementation chart. Uses the right sort of chips internally, and when it is up and running it will be a major contender. Multitimbral, using six-note polyphony.

Second-hand

YAMAHA FB01

Rough price: £120-170

Voices: 240 arranged in banks with 96 programmable; multitimbral, with up to eight notes spread over eight channels.

MIDI specs: Full spec with voicing and performance programming facilities.

Comments: Very nice four-operator sounds, though some are a bit thin. Voicing software is a must to take real advantage of this machine's facilities, as the front panel is not suitable for sound programming. There's ample software.

A pair of these units would be a good basis for a lot of work, and new ones are still around at discount prices. Not too good on percussive voices, though.

Synthesizers

YAMAHA
DX7

KAWAI
K1

ROLAND D50

Recommended retail price: £1,445

Voices: 64 onboard, plus 64 on memory card.

MIDI specs: Full specs including voice dumps and programming.

Keys/notes: 61 full-size notes with velocity and aftertouch sensing.

Comments: Fast became a standard synth. Uses LA (linear arithmetic) synthesis which creates some staggering sounds. Can combine layer and split sounds, though – like its rival the DX7 – it is not terribly multitimbral.

Expensive, but sounds excellent with built-in 32-stage reverb plus chorus.

KAWAI K SERIES: K1/K3/K5

Recommended retail price: K1 £595, K3 (second-hand) £350, K5 £1,495

Voices: K1 64 single + 32 multi, K3 50 single, K5 48 single + 48 multi.

MIDI specs: Pretty comprehensive, with Systems Exclusive well-served to allow voice dumps.

Keys/notes: 61 full-size keys velocity and aftertouch sensing.

Comments: A unique way of sound-creation starts out with sampled sounds, which are then combined. Kawai synths are now used quite a lot, and they'll likely be around for some time.

The K3 is fairly basic and the sounds from the factory are not too brilliant – it also has a slightly different way of sound-generation from the other two.

However they are all easy to work with, and sounds can be programmed from the front panel without too many tears. Nice fat sounds from all, but they're not good on impersonating acoustic instruments. Programming software is available.

Second-hand

YAMAHA DX7

Rough price: £650 =

Voices: Theoretically 128 with the ROM cartridge, but it depends what cartridge you're using.

MIDI specs: Depends on which one you get. Though they all look the same, the earliest models only transmit on Channel 1. Otherwise they're okay. Some of the later refinements of MIDI are ignored on a standard model.

Keys/notes: 61 full-size keys with touch and velocity sensing.

Comments: They hold their high price, which is only one reflection of their worth.

There are so many add-on kits, programming software packages, and voice cartridges that the world's best-selling synth is going to be around for many years.

Even now new voices appear for it, surpassing last year's models.

Not multitimbral in its undoctored form.

CASIO CZ101/1000/CZ1

Rough price: £150 =

Voices: 16 presets, 16 programmable. CZ1 has 64 presets, 64 programmable.

MIDI specs: Pretty full, though no velocity sensing on the CZ101/1000 models. They have a nasty habit of ignoring some commands – improved on CZ1.

Keys/notes: CZ101/1000 four-octave mini or full-size. The CZ1 has velocity sensing.

Comments: When programmed from voicing software with library facilities, the CZ range is capable of excellent sounds.

Multitimbral to a limited extent, with its own peculiar way of working – but a fairly essential piece of equipment.

YAMAHA DX100/21

Rough price: £165 +

Voices: 192 onboard, plus user-programmable section.

MIDI specs: Full specs.

Keys/notes: Four-octave mini or full-size nonsensing keys.

Comments: Lack of multitimbral facilities is a bind, but the sounds are pretty good and the DX100 takes up very little space. They can sense velocity provided you reprogram the voices and MIDI from a sensitive source.

Here we are entering the realm of the performance instruments. All have supporting programming software – and are tools of the professionals.

New

YAMAHA DX11

Recommended retail price: £679

Voices: Four banks of 32 voices each, plus performance memories and user-programmable voices – a total of 224 including cartridge.

MIDI specs: Full specs with full performance and tuning dumps.

Keys/notes: 61 full-size keys with aftertouch and velocity sensing.

Comments: Excellent instrument, basically a TX81Z expander with a keyboard and quick edit facilities. A very good buy for the money.

YAMAHA YS100

Recommended retail price: £699

Voices: 100 preset plus 100 user-programmable.

MIDI specs: Usual full specs. Accepts of MIDI voice dumps from other four-operator synths.

Keys/notes: 61 full-size keys with touch-sensitivity.

Comments: Easy to program from the front panel. Ten onboard digital effects including reverb. The instrument is also multitimbral via MIDI, and if you want some effects plus easy programming this new range is worth a sniff.

Samplers

These fall into two main categories as far as the micro user is concerned. There are the stand-alone professional sampler units, and there are the bolt-on devices. But the sad news is that the stand-alone samplers are expensive.

You can expect to pay up to £2,000 for a decent unit. And what makes a decent sampler is the sound quality. This in turn is related to the way in which the source sound is 'photographed' by the sampler.

It's rather like taking a series of snapshots of a piece of sound. The shorter the exposure, the clearer the picture. So if you have a fast sampling rate, the resulting sound will be clear and sharp whatever speed it is played back at – though you will chew up large amounts of memory.

The more bits the machine can handle, the better the sample – not always, but generally. So a 16-bit sampler has a pretty good chance of sounding better than an 8-bit sampler.

Other things to be considered are the maximum rate at which the machines can sample, and the ease with which the sound can be manipulated. Filters and other sound processors in the chain help to make the sound as clean as possible, and of course the analogue-to-digital processor needs to be fairly 'noiseless' – ie not introducing imperfections.

If you're after high quality, you'll need a stand-alone unit (or the Lynx). However, if you're after a good fun MIDI-compatible bolt-on, the only ones that are readily available are the Datal sampler for the Commodore 64 and the Music Machine for the Spectrum.

There is a sampler available for the Apple Macintosh, the Greengate, but there's very little music software in the UK for this machine.

And samplers have just been released for the Atari ST and the Commodore Amiga. Unfortunately they were not ready in time for this supplement, but TGM will keep you informed.



New

AKAI S900

Recommended retail price: £1,899

MIDI specs: Full specs, but doesn't use MIDI sample dump on Mark I series.

Comments: Fast became industry standard for the clean sound it produces. Not wonderful to program from the front panel, but supported by enough software now to make sample editing a little easier. Rackmount only.

ROLAND S10

Recommended retail price: £1,099

MIDI specs: Pretty comprehensive, obeying all the usual control commands – but no sample dump. Can be accessed and split into four banks of sounds.

Comments: Usually available at discounted prices, starting around £650. Comes with keyboard, and although the sampling is not of the highest quality, the cost outweighs that problem. Not too bad to work with either.

Stores on silly 3-inch 'quick' disks that are very slow and boring to work with. Has rackmount relations – the S220 and the slightly elder MKS100.

Second-hand

CASIO FZ1

Rough price guide: £900 +

MIDI specs: Full specs with all dump facilities – keyboard can be split and assigned areas with separate channels (up to eight).

Comments: Although not a joy to work with from the front panel, it has 16-bit resolution, giving very clean sound indeed. It's not very popular, and there's no supporting software, but it's an excellent instrument – pretty good sound, and expandable memory up to 2 Mbytes.

ENSONIQ MIRAGE

Rough price: £600 +

MIDI specs: No sample data, but all the usual MIDI controls are obeyed. Odd that it doubles up on out and thru ports. A bit duff in the multitimbral section.

Comments: The first sampler for the mass market. Although it's not perfect, the Ensoniq Mirage is a handy tool to have around. And the model you get may have had upgrades (check). Supported by programming software for most micros.



AKAI X700

Rough price guide: £650 +

MIDI specs: Well served, but lacks sample dump.

Comments: Comes in two boxes: player and disk-drive unit. Not the cleanest sampler around, and again it's had several updates. The sound usually lacks depth, but is still quite acceptable.

Hardware add-on samplers

Spectrum

RAM FLARE MUSIC MACHINE

Recommended retail price: £50

NUMBER OF SAMPLES CARRIED: Dependent on length of samples, but will hold up to two seconds of one sample.

MIDI specs: Will play back on one channel only, two notes at a time.

Comments: Excellent editing features, though the filtering of the sounds is very noisy. A pain to work with without disk or microdrive; all samples can be used in the sequencer.

CHEETAH SAMPLER

Recommended retail price: \$45

MIDI specs: Zilch.

Comments: The lack of MIDI spoils it as a serious contender, and its looping facility is a bit suspect. Still, the sound isn't too bad.

Commodore 64

DATel SOUND SAMPLER

Recommended retail price: £85

MIDI specs: None.

Comments: One of the better samplers for the 8-bit machines.

Drum machines

I wouldn't even dream of rating one above another. Each range has its own sound, and it's a matter of personal taste which you plump for.

Older drum machines will synchronize up to MIDI if you buy a converter sync box. Some of the better MIDI interfaces have CV (control voltage) outputs as well, but check to see if they match up to your machine.

As with samplers, there are several add-ons for micros, but not all of them have MIDI and they usually take over the whole of the computer, leaving no room for the rest of your creative talent.

New

ROLAND TR626

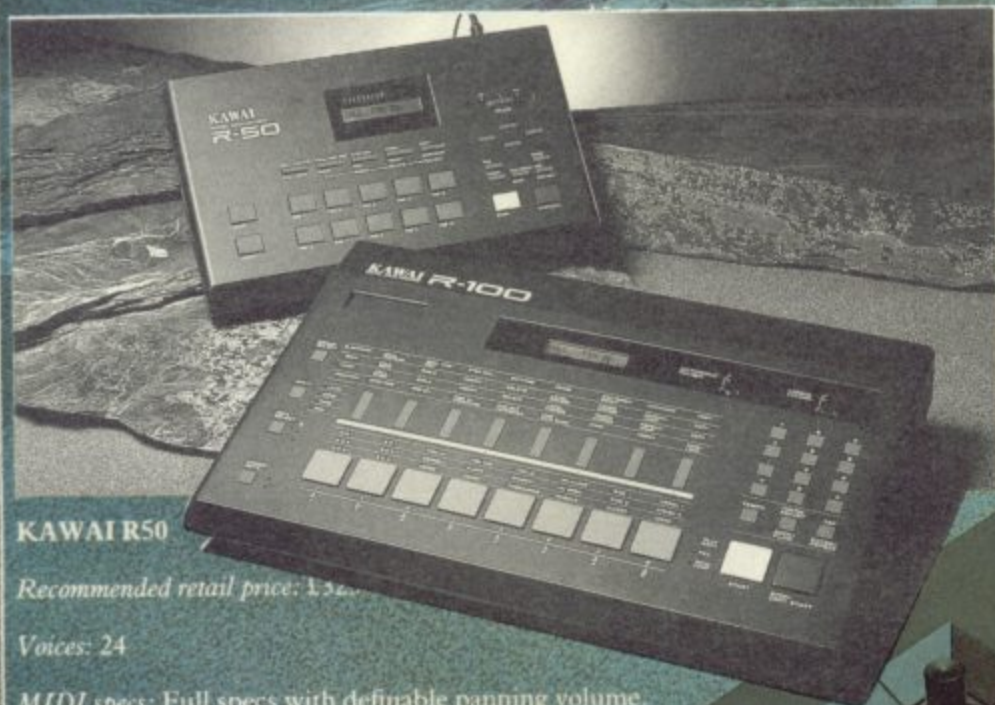
Recommended retail price: £350

Voices: 30 tunable PCM drum sounds.

MIDI specs: Nearly full spec; access to all sounds via assignable note numbers.

Comments: Excellent range of sounds and timbres that can cope with electro drums, and doesn't do a bad impersonation of the acoustic variety either.

Cymbals are a bit hissy, but otherwise a good tool. Eight separate outputs plus stereo and a wealth of sync ports.



KAWAI R50

Recommended retail price: £320

Voices: 24

MIDI specs: Full specs with definable panning volume.

Comments: Slimmed-down version of the rather splendid R100, but still retains most of the good points. Stereo output, but uses the same voices and MIDI specs as the R100.

Second-hand

YAMAHA RX21

Rough price: £100

Voices: Nine.

MIDI specs: Fairly limited, until you discover that instead of driving its internal sequencer you can go into CH INFO mode and access all the drums individually.

Comments: Sounds are a bit dull, but the cymbals are quite good. It will sense velocity information in CH INFO mode.

ROLAND TR505

Rough price: £135 +

Voices: 16.

MIDI specs: All the usual song position pointers, plus assignable notes for each drum sound.

Comments: Excellent voices much used (and abused) on many records. And look out for its predecessors – the 606, 707 and 808.

There are also several bolt-on kits for micros. But, as with the samplers, you usually find that when your micro turns into a drum machine it has little room for anything else.

Above all, look for MIDI compatibility. Cheetah's best-selling Spec-Drum was marred by this oversight. And though it's a fine tool it's best as part of a system where you spend most of the time recording and overdubbing on tape, rather than building up tracks on a sequencer.

But you could always borrow a computer and lash two together. And if you are one of the many who have upgraded from a Spectrum to an ST, then instead of selling your 8-bit goodies why not MIDI them up to the ST? You'd have a coordinated system ripe for expansion.

Controlling keyboards



New

CHEETAH MK5

Recommended retail price: £99.95

MIDI specs: Fairly comprehensive, though a bit slow for real-time performances. Messy on patch changes, but still very usable.

Comments: Though it's not touch-sensitive and has the pitch-bend wheel in a silly place, this is nevertheless a good value-for-money deal – new or second-hand. It has larger and more comprehensive relatives, but sadly these have not been available for review yet.

Second-hand

YAMAHA KX88

Rough price: £300

MIDI specs: Full specs.

Comments: Full weighted piano keys, with good action and simple MIDI function buttons. Certainly good for live use, if a bit extravagant in the living room.

Software is all-important. It's a question of weighing up how much you can afford, what you want from a system – and what's available for your micro.

There are basement bargains for the Spectrum and the Commodore 64.

For Spectrum users, there's the choice of an XRI or Music Machine interface, plus software, which should cost you less than about £50. Shopping around for both machines will produce some startling bargains, and you can always expand rather than replace the system as you upgrade your micro.

For the 64, I would recommend any of the Joreth software and the Sonus and Steinberg software, not forgetting the Island Music System.

The BBC, a micro which never really took a hold in this field, is served by EMR software and the rather oddly-named UMI 2B system, which holds the program on a custom chip. It's still rather expensive, and can be seen advertised in the appropriate second-hand columns.

Atari STs, Amigas and IBM PC-compatibles now have such a wealth of software that I would be hard pushed to recommend one. There are sequencers available as cheap public-domain software, which may well give you a taste.

But my own favourites are the Steinberg *Pro 24* and the C-Lab *Creator*, both of which carry a fairly hefty price tag and are ST-based.

TGM expects a flood of Amiga and PC software on the review bench in the near future – this year's PC Show was full of 'soon to be available' programs for these micros. For instant erudition on the ins and outs of sequencing and other programs, read our music columns.

The past two years have seen exciting explorations on the frontiers of MIDI (I have a friend who has unkindly called it 'midiocy'). We now have guitars that can transmit and receive MIDI from Roland and Casio; from Casio and Yamaha we now have wind instruments specially constructed so that they are, in effect, breath controllers for MIDI instruments.

Many of the up-market sound processors and multieffect boxes are MIDI-linked, so that at any given point in the playback the sequencer will select a certain effect for a particular instrument. I myself use a multikeyboard that is – in effect – five synthesizers, a sampled drum machine, and five built-in sequencers, all with full MIDI control and dump facilities!

Mixing desks provide a digital studio in the home – using the computer MIDI linked to everything bar the goldfish to control the sound, and finally mixing on to the DAT (digital audio tape) cassette.

On the professional level, it is now possible to transmit MIDI data via satellite from one studio to another anywhere in the world.

The possibilities are endless; a studio could access a central MIDI library to draw on a bank of sounds and sequencers, or the precise acoustics of any auditorium in the world.

But in the race of technology it must still be you, the user, who commands the machine. When the machine is dictating the terms of creation, the results are stale and boring. Use and abuse the technology. Don't let it use you or get in the way of the music!

ADSR Attack-decay-sustain-release; the most common form of envelope shaper.

AMPLITUDE The size of a sound signal, usually the same as volume.

ANALOGUE Continuously variable, a synthesizer that uses electricity (voltage) to create and control the sound. The other way of creating sound is digitally (using computer language).

ATTACK The first stage of an envelope – the time it takes for the envelope to rise from its initial level to its maximum level.

AUTO CORRECT A facility found on sequencers that enables the timing of the notes to be corrected to the nearest part of a beat. It prevents inaccuracies that could occur in real-time sequencing (also called **QUANTIZE**).

BENDING Raising or lowering the pitch of a note. This term is usually only used when the note is bent a small amount.

CARTRIDGE MEMORY A device that enables digital information to be stored on an ordinary audio cassette. It is often used to store voice libraries or sequences. It works very like a microcomputer storing programs on cassette.

CLOCK A device that sends a pulse to several synthesizers (or from one instrument to another). It will ensure that all the instruments play in perfect synchronization. It is often a microcomputer that acts as a clock.

CONTROLLER Something that gives you musical control over the synthesizer. In most cases this is a keyboard. It could also be a computer.

CONTROL VOLTAGE The electricity used to control the various parts of a synthesizer. For example, the voltage controlled amplifier (VCA) receives specified amounts of electricity at certain times, depending on how the envelope is set up.

CUTOFF FREQUENCY The frequency around which a filter will operate.

DC Digitally controlled – the sound is created or modified using computer language.

DECAY The second stage of the sound envelope, the time which the sound takes to fall back from its maximum level to the sustain level.

ENVELOPE The shape of the final sound. (See **ADSR**.)

FREQUENCY MODULATION A method of synthesising sound by combining and interacting several similar waveforms.

FILTER A device that adjusts the tone of the basic sound produced by the oscillator. It works by blocking out the unwanted frequencies.

GLISSANDO An automatic effect, causing the pitch of the note to slide between two consecutive notes.

HARMONICS The frequencies above the basic note which also sound when the note is played. All acoustic instruments have them, but on synthesizers they have to be added to the basic sound by using filters and extra

oscillators. This is why synthesizers rarely sound exactly like acoustic instruments – the harmonics provide a richness of tone. Also called overtones.

KEYBOARD SPLIT Two sounds can be played simultaneously at each side of a predetermined split point.

LFO Low-frequency oscillator, often used in conjunction with the VCO or VCF to create either vibrato or tremolo effects (see also **MODULATION**).

MODIFIER Any part of the synthesizer that changes the basic sound created by the oscillator. It modifies the sound.

MONOPHONIC Can play only one note at a time.

OSCILLATOR The vibrating unit of the synthesizer which gives the basic sound – usually with a choice of waveforms.

OVERTONES see **HARMONICS**.

PATCH The particular setting required by a synthesizer to create a specific sound.

PITCH The highness or lowness of a note, measured in feet, and derived from the length of the organ pipe that would produce that sound.

The foot measurement doubles each time you go down an octave, ie a '16-foot' note is one octave lower than an '8-foot' note. The range of notes in normal use is – very roughly – 32 feet (the lowest) to 2 feet (the highest).

Pitch can also be indicated by the note name (A-G; natural, sharp, flat, double sharp, or double flat) and the octave number (this is essential because every note name occurs in every octave).

PITCH BEND See **BENDING**.

PITCH CONTROL The overall tuning adjustment.

POLYPHONIC Capable of playing more than one note at the same time.

PROGRAMMABLE A programmable synthesizer is one that can memorize the settings of its controls, so that particular sounds created can be quickly recalled with simple commands.

QUANTIZE See **AUTO CORRECT**.

RELEASE The fourth stage of the envelope-generator. It allows the sound to carry on after the note has been released.

RESONANCE Part of the filter section; it boosts certain frequencies to change the tone of the sound.

SOUND SOURCE See **OSCILLATOR**.

SUSTAIN The third stage of the envelope-generator. It defines how long the note will remain while the key is held down.

TREMOLO An effect in which the filtering is slightly pulsed by a LFO, causing the sound to fade and return rapidly. (But in some areas of music, such as classical singing, tremolo can also mean a rapid but very slight variation in pitch – see **VIBRATO**.)

VC Voltage control. A synthesizer that uses voltage to control the means of creating or altering the sound.

VCF Voltage-controlled filter.

VCA Voltage-controlled amplifier.

VCO Voltage-controlled oscillator.

VIBRATO An effect in which the pitch of the note played is raised and lowered slightly giving a wobbly effect. The speed is usually controlled by LFO. Overused as a sentimental effect!

WAVEFORM Types of oscillations produced by the VCO; each waveform has a different basic sound and shape.

WHITE NOISE A hissing sound, rather like a radio tuned to no station. White noise is actually created by fast random selections of all the frequencies, sounds and waveforms that we can hear.

The TGM cassette

■ *The Whistler* (Do Bap Bop) started life as a classroom experiment. I'm still not convinced that I wrote it. I used a Steinberg Pro 24 as controller plus a CZ101 for whistle, DX 7 for bass, and Hammond impersonation from CS70 – the rest of sounds are from the HS6. No overdubs – I recorded straight onto the master.

■ *Pussyfootin'* Bass line ripped off from an old Geno Washington number and played on the CS70's sequencer, which by some miracle ran at the same speed as the Steinberg for this piece. No MIDI. Strings from DX7 using a Quasar program voice. Noises from CS70, brass from K3, drums from R100 and HS6, twiddly bits from DX100. Directly mastered.

■ *Toad Overture* Written for a theatre production of *Toad Of Toad Hall*, this features mainly CX5 voices with a little bit of DX7 strings thrown in. Lead sound is overdubbed CX5 using the *Bitimbral* program. Sequencers all done on *Composer* program on CX5.

■ *One Across* Ballet score – they'd choreographed it to a Prince track and then decided that a different piece was needed. Piano from DX7 with CLab voicing MIDI up to DX100 piano voice. Bass is from MIDI CZ101 and DX7, drums from R100 and RX21. Middle section is HS with brass stabs from DX7. Sequenced on *CLab Creator* and overdubbed on MT1X.

■ *Java By Quatt* Sequenced on CX5 MIDI sequencer; voices are all DX7 and DX100 with some CZ101 added. Written for a Javanese play.

■ *Spiders' Ballet* Used lots of overlapping sequences on the CX5 composer program which were then transferred via MIDI to the CLab Creator. Sounds from HS6 and DX7.

■ *K576, first movement* Mozart's Piano Sonata no 21 in D major. I've often wondered what these sonatas would sound like, if orchestrated as they lend themselves to the task very well. Written on the CX5 composer program and then realised using DX7, HS6 and CX5 voices.

Recorded on MT 1X. (K576 is the number musicologists use to refer to this piece.)

■ *Turning The Tables* Uses pretty well all the gear mentioned previously. This was conceived for Newsfield's computer-art exhibition at the PC Show, but it didn't fit when I saw the video. Steinberg Pro 24 and directly mastered.

■ *Pictures At The PC Show* The final soundtrack for the Newsfield graphics video, repeated ad nauseam on the stand. Main sound is CZ101 with voice from *Android* program, drums R100, lead sound from DX100 plus Quasar voicing on DX7 for clipped clarinet work. Steinberg and direct mastering.

■ *Another Serial* Started life as a project for composing noises, and was done on the CX5 with a set of Japanese voices. Crossed over to the CLab, it was extended to fit a dance performance workshop.

■ *African Sunrise* All done on the DX7 and overdubbed – written for a play set in Africa.

■ *Houseman* DX7 overdubbed. Mock Mozart by numbers!

■ *Lento Con Espressione*: DX7 overdubbed. This was scored out first for string orchestra, and owes plenty to Gustav Mahler.

■ *The Tilt* Opening song from a Dario Fo play, it uses DX7, DX100 and HS6.

As this list was put together before the tape was finally assembled, lucky purchasers may well find several alterations and additions to the above list.

The whole project was conceived, played and composed by Jon Bates Esq, so any flack is to be directed at him – that's me!

It was mastered on a Revox A77 using Ampex 454 tape. Some of the tracks were recorded onto the Yamaha MT1X four-track first, if overdubs were required, and the recording was done either in my own studio/study or at Kidderminster College in

Worcestershire.

The mixdown was done through a Soundcraft 16-4-2 desk with the following outboard gear: Klark Technic DN27 Graphic Equaliser, Klark Technic DN360 Digital Time Processor, Klark Technic Dual Channel Reverb, Klark Technic Analog Delay Line, Klark Technic Digital Delay Line, Yamaha SPX90MK1, Rebis Stereo Noise Gate.

The synths were: DX711FD, DX100, Kawai K3, Casio CZ1, Yamaha HS6 multikeyboard, RX21 drum machine, Kawai R100 drum machine, Yamaha CS70 analogue synth.

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